Z. Säugetierkunde 58 (1993) 194–196

ISSN 0044-3468

A dental peculiarity in *Numidotherium koholense*: evidence of feeding behaviour in a primitive proboscidean

By N. Court

Sedgwick Museum, Department of Earth Sciences, University of Cambridge, Cambridge, U.K.

Receipt of Ms. 19. 9. 1991
Acceptance of Ms. 27. 12. 1992

The fossil proboscidean, *Numidotherium koholense* is known only from the Palaeogene of Algeria (Mahboubi et al. 1984). Abundant remains of this tapir-sized mammal have been recovered from a single locality at El Kohol in Eocene deposits of the Southern Atlas of Algeria (see Mahboubi et al. 1986 for site details). The late Early Eocene age ascribed to this locality renders *Numidotherium* the oldest unequivocal representative of the order Proboscidea yet known. Material includes numerous isolated teeth, jaws and skulls, in addition to postcranial elements. Although *Numidotherium* is morphologically well documented (Mahboubi et al. 1986) and has been included in recent phylogenetic treatments of the order (Tassy 1990), as yet nothing is known of numidothere life habits or autecology.

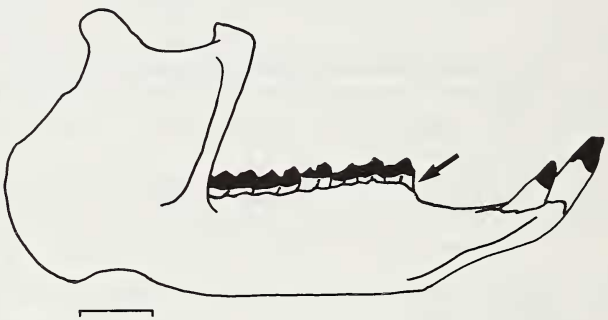

Fig. 1. Outline drawing of right mandibular ramus of *Numidotherium koholense* in lateral view. Note the long diastema and the way in which the alveolar border in front of P2 descends steeply to expose the anterior root (arrow). Modified from Mahboubi et al. 1986). Scale = 50 mm

The first tooth in the mandibular postcanine dentition (P2) is morphologically simple, consisting of a single high anterior cusp and a low distal heel; it is the wear on this tooth that forms the subject of the following communication. The mandibular dental formula consists of two incisors, three premolars and three molars, each of the latter bearing two cross-crests indicating a diet of herbivorous brows. The mandible is robust with enlarged incisors projecting anteriorly and slightly dorsally from a long synostosed symphysis. A substantial diastema occurs between the first premolar (P2) and the incisors, the free alveolar border descending quite steeply from P2 to the enlarged incisors (Fig. 1). Crown wear on P2 is unremarkable and clearly related to normal tooth-food-tooth interactions during mastication; however the most peculiar feature of this tooth occurs on the anterior root. Situated on the anterobuccal side of the anterior root just below the crown enamel there is a deep but smooth notch-like excavation (Fig. 2). The deepest part of this

depression is located just below the crown and trends posterobuccally and slightly dorsally. Viewed under the binoccular microscope this excavation is seen to be covered in fine parallel striations trending posterodorsally. There can therefore be little doubt that this is a wear induced feature. Tooth wear and dental function are generally well understood in herbivorous mammals (Fortelius 1985); however, wear in this position on a tooth is certainly anomalous. Had the illustrated tooth (Fig. 2) been the only example exhibiting this peculiarity it might then have been explicable in terms of some form of dental pathology leading to malocclusion. Further investigation, however, revealed that this facet occurs, to varying degrees, on all lower P2's, both left and right where this part of the tooth is preserved. This peculiarity pertains only to the anterior-most lower premolar and has not been found to occur at any other locus within the postcanine dentition.

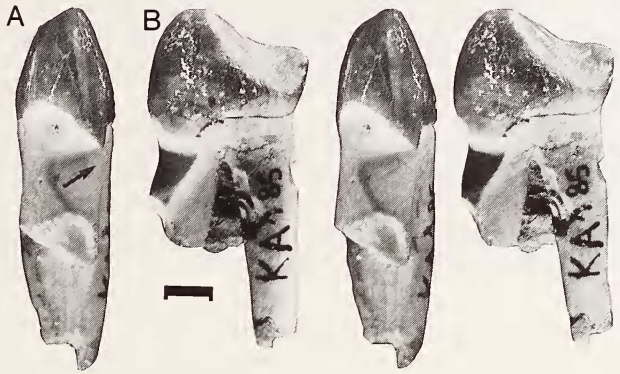

Fig. 2. A, KA 185, Stereophotograph left lower P2 of *Numidotherium koholense* in anterior view. B, KA 185 Stereophotograph of left lower P2 in buccal view. A wedge shaped excavation can be seen on the anterobuccal surface of the anterior root. Arrows show the direction of striations on the surface of this feature and indicate that is the result of food abrasion. Scale = 5 mm

The inevitable conclusion is that this pattern of root abrasion has resulted from some aspect of the habitual feeding behaviour in numidotheres and is not a phenomenon restricted to aberrant individuals. Moreover, it is impossible that such root wear could have resulted from normal tooth-food-tooth interactions during mastication. The only plausible cause of wear in this position is that of abrasion caused during food procurement. Since jaw movement relative to the abrasive food-stuff is likely to be the cause of this particular feature, the fact that the depression and striations upon it are orientated from anterolingual to posterobuccal and incline posteriorly (Fig. 2) indicates that the relative direction of causative jaw movement was orientated ventrolaterally.

How then might this pattern of wear have occurred? The most likely explanation is that fibrous plant material was secured within the oral cavity, either between the teeth on one side of the jaw, or by pressures applied by the tongue. The head was then forcibly rotated in a ventrolateral direction. Such a head movement would cause the plant material to slide unobstructed across the mandibular diastema until it came up against the anterior tooth in the premolar row on that side of the jaw opposite the direction of head movement. As noted above the alveolar border in front of the anterior-most premolar descends steeply such that the anterior root of P2 stands proud of the alveolar bone (Fig. 1). The result is that this part of the tooth becomes abraded during the described behaviour. A very similar pattern of dental wear in the European cave bear *Ursus spelaeus*, has been interpreted as evidence of herbivory in this carnivore (Breuer 1933).

This straightforward observation illuminates at least one aspect of food procurement behaviour in the earliest or proboscideans, and indicates that *Numidotherium* likely specialised on brows occurring at or above head height. Finally, since bilophodonty is associtaed with the comminution of leaves, it is not inconceivable that numidotheres utilised the described behaviour to strip leaves from slender branches.

Acknowledgements

Thanks to Prof. J.-J. Jaeger for allowing me facilities and access to material. Drs. M. Fortelius and J. Shoshani kindly commented on my observations. Dr. F. v. Mering kindly provided a translation of Breuer (1933).

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Author's address: Dr. Nick Court, Sedgwick Museum, Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge, CB2 3EQ. U.K.